

SNC 1DI
Practice Test - Chemistry

Name: _____ANSWERS_____

Date: _____

Multiple Choice: Circle the most correct answer.

1. Which of the following properties of sugar is not a physical property?
(a) Sugar turns black when it is heated.
(b) Sugar dissolves readily in water.
(c) Sugar has a sweet taste.
(d) Sugar is a white solid at room temperature.
2. Which of the following describes a chemical property?
(a) Hydrogen reacts explosively with oxygen.
(b) Mercury is a liquid at room temperature.
(c) Aluminum is malleable.
(d) The density of gold is 19.3 g/cm^3 .
3. All of the following are properties of magnesium. Identify the physical property.
(a) Magnesium burns in air with a brilliant white flame.
(b) Magnesium reacts with hydrochloric acid to produce a gas.
(c) Magnesium is a good conductor of electricity.
(d) Magnesium combines with nitrogen to form a black powder.
4. The use of electricity to cause chemical changes in substances is called
(a) electrostatics
(b) electrolysis
(c) electrification
(c) synthesis
5. Which one of the following is an example of a chemical change?
(a) the melting of candle wax
(b) making sawdust by sawing wood
(c) the rotting of food
(d) the breaking of glass
6. The number of electrons in the outermost orbit of a phosphorus atom is
(a) 2
(b) 8
(c) 5
(d) 15
7. Which one of the following is an example of a physical change?
(a) baking a cake
(b) cutting paper into strips
(c) bleaching a stain in clothes
(d) food digesting in your stomach
8. The least reactive element in the following list is
(a) argon.
(b) gold.
(c) potassium.
(d) copper.
9. Sulphuric acid is used in many industrial processes. If concentrated sulphuric acid has a density of 1.84 g/mL , what is the mass of a 26.2 mL sample?
(a) 0.0702 g
(b) 14.2 g
(c) 26.2 g
(d) 28 g
(e) 48.2 g

$m = DV$
 $= (1.84 \text{ g/mL})(26.2 \text{ mL})$
 $= 48.2 \text{ g}$

10. Which of these ideas about atomic structure was developed by Rutherford?
- (a) electrons orbit in fixed shells
 - (b) atomic number should be the basis for the periodic table
 - (c) the atom has a nucleus and an electron cloud**
 - (d) the muffin model
 - (e) all atoms of an element are identical
11. To which chemical family does the element neon belong?
- (a) alkali metals
 - (b) alkaline earth metals
 - (c) halogens
 - (d) noble gases**
 - (e) none of the above
12. Which of the following is not a piece of evidence indicating that a chemical change has probably taken place?
- (a) Bubbles of a gas appear when a solid is placed in a solution.
 - (b) A blue precipitate forms when two solutions are added together.
 - (c) A solid dissolves when added to water.**
 - (d) An orange solid changes to grey when heated, and stays grey when cooled.
13. The granola you eat for breakfast is a heterogeneous mixture.
- (a) True**
 - (b) False
14. Which of the following is a pure substance?
- (a) a soft drink
 - (b) milk
 - (c) sugar**
 - (d) shampoo
15. Isotopes of the same element have
- (a) the same number of protons and a different number of neutrons.**
 - (b) the same number of neutrons and a different number of protons.
 - (c) the same number of protons and a different number of electrons.
 - (d) the same number of electrons and a different number of protons.
16. Which of the following is a mixture?
- (a) a soft drink**
 - (b) distilled water
 - (c) sugar
 - (d) salt
17. How much mercury ($D=13.6 \text{ g/cm}^3$) would it take to make 100 kg?
- (a) 136 mL
 - (b) 7300 mL**
 - (c) 136 000 mL
 - (d) 735 000 mL
 - (e) none of the above
- $V=m/D$
 $= (100000\text{g}) / (13.6\text{g/cm}^3)$
 $= 7352 \text{ mL}$
18. Which of the following is an example of a compound?
- (a) gold
 - (b) orange juice
 - (c) hydrogen gas
 - (d) water**
19. Air is an example of
- (a) solution**
 - (b) mechanical mixture
 - (c) element
 - (d) compound
20. One model of the atom is sometimes referred to as the "raisin bun" model. In this model, the raisins represent the
- (a) protons
 - (b) neutrons
 - (c) nucleus
 - (d) electrons**

21. Which of the following lists of properties is characteristic of metals?
- (a) Shiny, brittle, conduct heat and electricity.
 - (b) Shiny, malleable, conduct heat and electricity.**
 - (c) Shiny, malleable, do not conduct heat and electricity.
 - (d) Shiny, malleable, conduct heat but not electricity.
22. A substance composed of two or more elements chemically combined is called
- (a) a mixture.
 - (b) a compound.**
 - (c) a solution.
 - (d) a precipitate.
23. Neutrons are
- (a) negatively charged particles found outside the nucleus in an atom.
 - (b) neutral particles found outside the nucleus in an atom.
 - (c) neutral particles found in the nucleus in an atom.**
 - (d) positively charged particles found in the nucleus in an atom.
24. The most metallic elements in the periodic table are found:
- (a) on the extreme right of the table
 - (b) on the extreme left of the table**
 - (c) in the middle of the table
 - (d) in the second column
25. Which property is described by the statement that aluminum can be bent into various shapes?
- (a) density
 - (b) malleability**
 - (c) hardness
 - (d) viscosity
26. The total number of atoms represented by the formula $K_2Cr_2O_7$ is
- (a) 1
 - (b) 3
 - (c) 11**
 - (d) 28
27. Which of the following lists consists only of metals?
- (a) titanium, zinc, copper, lead, aluminum**
 - (b) silver, chromium, oxygen, tin, copper
 - (c) gold, mercury, carbon, iron, lead
 - (d) nickel, platinum, chlorine, aluminum, silver
28. Moving down a column (family) in the periodic table, the number of electrons in the highest orbit
- (a) increases gradually.
 - (b) decreases gradually.
 - (c) shows no pattern.
 - (d) remains constant.**
29. Rows in the periodic table are also referred to as
- (a) periods.**
 - (b) families.
 - (c) groups.
 - (d) columns.
30. The element with the symbol Na is:
- (a) Potassium
 - (b) Nitrogen
 - (c) Nalium
 - (d) sodium**
31. Protons are
- (a) positively charged particles found outside the nucleus in an atom.
 - (b) negatively charged particles found outside the nucleus in an atom.
 - (c) neutral particles found in the nucleus in an atom.
 - (d) positively charged particles found in the nucleus in an atom.**

32. Electrons are

- (a) positively charged particles found outside the nucleus in an atom.
- (b) negatively charged particles found outside the nucleus in an atom.**
- (c) neutral particles found in the nucleus in an atom.
- (d) negatively charged particles found in the nucleus in an atom.

33. Which group in the periodic table contains the noble gases?

- (a) 1
- (b) 2
- (c) 7
- (d) 8**

34. An element with characteristics of a metal and a non-metal is known as a

- (a) noble gas
- (b) alkali metal
- (c) metalloid**
- (d) hydrogen

35. When molecules combine, they form atoms.

- (a) True
- (b) False**

Matching: Beside each number, write the term from column B that best fits the description.

	Column A	Column B
<u> d </u>	1. where electrons are located in an atom	a. 8
<u> c </u>	2. the number of electrons that the first energy shell can hold	b. mass number
<u> a </u>	3. the number of electrons that the second energy shell can hold	c. 2
<u> b </u>	4. the total number of protons and neutrons in the nucleus	d. energy level
<u> g </u>	5. the number of protons in the nucleus	e. ionic bonding
<u> e </u>	6. occurs when one atom gives up its electrons to another atom	f. covalent bond
<u> f </u>	7. the sharing of electrons	g. atomic number

Short Answer

1. Label each of the following as either a physical property or chemical property.

- (a) Copper sulphate crystals are blue. physical
- (b) Gold is an excellent conductor of electricity. physical
- (c) Iron rusts when exposed to air and water. chemical
- (d) Salt is soluble in water. physical
- (e) Calcium reacts with water to produce hydrogen. chemical
- (f) Gasoline burns in an automobile engine. chemical

2. State whether each of the following changes is a physical change or a chemical change.
Give a reason for your answer in each case.

(a) The snow on the sidewalk outside your house melts.

___physical - change in state from solid to liquid_____

(b) A piece of silverware gradually tarnishes when left exposed to air.

___chemical - new substance formed, silver oxide, change in colour_____

(c) Milk turns sour after several days.

___chemical - new substance forms, precipitate_____

(d) The three sugar cubes that you add to your coffee disappear when you stir the coffee.

___physical - sugar dissolves but you could get sugar back by evapourating coffee_____

(e) You accidentally spill some bleach on your favourite blue shirt and end up with white stains on the shirt.

___chemical - change in colour_____

(f) To reconnect a loose wire in your computer, the technician melts some solder.

___physical - melting is a physical process_____

(g) The melting of ice cream.

___physical - melting is a physical process_____

(h) The mixing of cake batter in a bowl.

___physical - stirring is a physical process_____

(e) The explosion of a firecracker.

___chemical - heat and light are produced_____

3. Complete the following chart.

Gas	How to test for gas.	What is observed if the gas is present.
oxygen	Glowing splint placed in gas	Glowing splint bursts into flames
carbon dioxide	1. Gas poured into limewater 2. Blazing splint placed in gas	1. Limewater turns from clear to milky 2. Blazing splint is extinguished
hydrogen	Blazing splint placed in gas	Blazing splint makes a "pop" sound

4. Complete the following chart.

Gas	Description	Density Compared to Air?	Does it Burn?	Does it support Combustion?
Oxygen (O ₂)	Colourless, odourless, gas	Same	No	Yes
Carbon dioxide (CO ₂)	Colourless, odourless, gas	Heavier	No	No
Hydrogen (H ₂)	Colourless, odourless, gas	Lighter	Yes	No

Density Calculations:

Show FULL solutions for the following problems.

5. A rectangular solid measures 5.0 cm x 7.5 cm x 15.0 cm and has a mass of 6500 g. Calculate the density of the object.

$\sqrt{G}: l = 5.0 \text{ cm}, w = 7.5 \text{ cm}, h = 15.0 \text{ cm}, m = 6500 \text{ g}$
 $\sqrt{R}: V = ?, D = ?$
 $\sqrt{A}: V = l \times w \times h \quad \sqrt{D} = m/V$
 $S: V = (5.0)(7.5)(15.0) \quad D = (6500 \text{ g})/(562.5 \text{ cm}^3)$
 $\sqrt{V} = 562.5 \text{ cm}^3 \quad \sqrt{D} = 11.6 \text{ g/cm}^3$
 $\sqrt{S}: \text{Therefore, the density of the object is } 11.6 \text{ g/cm}^3$

6. A object whose mass is 50 g is dropped into a graduated cylinder containing 150 mL of water. The water rises to the 350 mL mark. What is the density of the object?

$\sqrt{G}: m = 50 \text{ g}, V_{\text{start}} = 150 \text{ mL}, V_{\text{final}} = 350 \text{ mL}$
 $\sqrt{R}: V_{\text{object}} = ?, D = ?$
 $\sqrt{A}: V_{\text{object}} = V_{\text{final}} - V_{\text{start}} \quad \sqrt{D} = m/V$
 $S: V_{\text{object}} = 350 - 150 \quad D = (50 \text{ g})/(200 \text{ mL})$
 $\sqrt{V_{\text{object}}} = 200 \text{ mL} \quad \sqrt{D} = 0.25 \text{ g/mL}$
 $\sqrt{S}: \text{Therefore, the density of the object is } 0.25 \text{ g/mL}$

7. A piece of plastic has a density of 0.805 g/cm³ and a volume of 550 cm³. What is the mass of the plastic?

$\sqrt{G}: D = 0.805 \text{ g/cm}^3, V = 550 \text{ cm}^3$
 $\sqrt{R}: m = ?$
 $\sqrt{A}: m = DV$
 $S: m = (0.805 \text{ g/cm}^3)(550 \text{ cm}^3)$
 $\sqrt{m} = 442.8 \text{ g}$
 $\sqrt{S}: \text{Therefore, the mass of the plastic is } 442.8 \text{ g}$

8. The density of a certain grade of gasoline is 0.750 g/mL. What volume would be occupied by 150 g of the liquid?

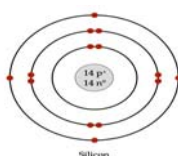
$\sqrt{G}: D = 0.750 \text{ g/mL}, m = 150 \text{ g}$
 $\sqrt{R}: V = ?$
 $\sqrt{A}: V = m/D$
 $S: V = (150 \text{ g})/(0.750 \text{ g/mL})$
 $\sqrt{V} = 200 \text{ mL}$
 $\sqrt{S}: \text{Therefore, the volume of the gasoline is } 200 \text{ mL}$

9. Draw Bohr-Rutherford diagrams for
- Beryllium (Be) atomic number 4, mass number 9
 - Silicon (Si) atomic number 14, mass number 28
 - Argon (Ar) atomic number 18, mass number 40

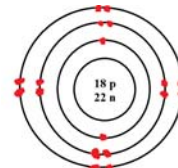
a)



b)



c)



10. Draw Lewis Dot Diagrams for the following elements:

Mg

Al

Br



11. Indicate on the following periodic table using arrows and labels:

- a family
- a period
- the division line between metals and non-metals
- the Noble gases, the Alkali metals, the Alkaline Earth metals.

[illegible]

12. Fill in the blanks.

- The nucleus is the center of the atom containing most of its mass.
- Noble gases do not form compounds with most other elements.
- The nucleus of an atom consists of protons and neutrons.
- The energy levels surrounding the nucleus consist of electrons.
- Metals conduct electricity, are malleable and are lustrous.

13. Describe the similarities and/or differences between each pair of terms listed below.

- a. element/compound

Sim: Both elements and compounds are made of atoms

Diff: Elements contain only one type of atom. Compounds have two or more types of atoms bonded together.

- b. atomic number/mass number

Sim: Both numbers include protons.

Diff: Atomic number just includes protons. Mass number is the number of protons and neutrons.

- c. family/period

Sim: Both the family and period are on the periodic table

Diff: Family is the vertical columns on the periodic table. Periods are the horizontal rows.

- d. ionic bond/covalent bond

Sim: Both are ways in which elements bond to become like the Nobel gases.

Diff: Ionic bonding occurs when elements **GAIN** and **LOSE** electrons. Covalent bonding occurs when elements **SHARE** electrons.

14. a. Describe the apparatus used by Rutherford to investigate Thompson's model of the atom.

Used positive, alpha particles and shot them through a piece of gold foil

- b. What did Rutherford expect to see and what did he see?

Rutherford expected that all of the particles would pass straight through the foil

What he saw was that a small percentage of alpha particles were deflected and an even smaller percentage bounced straight back

- c. Describe Rutherford's new model of the atom. What did he discover?

New model of the atom is a positive, dense nucleus with an electron cloud around the nucleus

He discovered that 1. The atom was mostly empty space and 2. The nucleus is a tightly packed, dense, positive charge in the centre of the atom.

15. Find the element Cesium (Cs) in the periodic table. From its position in the periodic table make a prediction for each of the following statements.

- a. Is Cesium a metal or a non-metal?

Cesium is a METAL

- b. Is Cesium more or less reactive than sodium?

Cesium is MORE reactive than sodium

- c. Is Cesium malleable or brittle?

Cesium is MALLEABLE

- d. What is its state at room temperature?

Cesium is a SOLID at room temperature